Reprinted from the
University Medical Magazine,
April 1890.

# SUSPENSION IN LOCOMOTOR ATAXIA.

By S. Weir Mitchell, M.D., LL.D.,

*With a summary of twenty-three cases from the Clinical Service of Dr. Mitchell, reported by Dr. Guy Hinsdale from the tables of the resident, Dr. Caspar W. Sharples.*

REPRINTED FROM THE
UNIVERSITY MEDICAL MAGAZINE,
April 1890.

# SUSPENSION IN LOCOMOTOR ATAXIA.

BY S. WEIR MITCHELL, M.D., LL.D.,
*With a summary of twenty-three cases from the Clinical Service of Dr. Mitchell, reported by Dr. Guy Hinsdale from the tables of the resident, Dr. Caspar W. Sharples.*

THE apparatus used is a modification of the suspension arrangement of Dr. Motchoukowsky, of Odessa, but as made for me is easily borne for longer periods and gives rise to little annoyance. The essential change lies in suspension from the elbows as well as from the chin and occiput.

CASE I.—John T., aged 35. Fifty suspensions. Ataxic. Sensation: Before treatment there were occasionally pains, sometimes severe, lasting twenty-four hours. Pains are now less severe and less frequent. Gait has been characteristic; did not use a cane. It is now improved though ankles feel weak. Station improved; swayed much with eyes closed; K.-J. absent; no change. Bladder: Urine came slowly; now better, though strains a great deal Rectum held feces; now is merely costive. Sexual power lost; no improvement. Pulse: Before suspension, 100; during suspension, 110; after suspension, 90. Respirations: Before suspension, 16; during suspension, 24; after suspension, 24. Average amount of extension, 1¼ inches; maximum, 1½ inches; minimum, 1 inch.

CASE II.—Christopher H., aged 40. Ataxic. After eighty suspensions all his symptoms are unchanged, although after twenty-six suspensions he rarely had pain. His gait very characteristic; at first improved. Station unchanged; he would fall with eyes closed. No K.-J. before or after treatment. He held his urine with difficulty at first, but reported himself after twenty-six suspensions as having better control, and as having many erections where before sexual power was lost. Pulse: Before suspension, 105; during suspension, 155; after suspension, 78. Respirations: Before suspension, 16; during suspension, 22; after suspension, 24. Average amount of extension, 1 3-16 inches; maximum, 1 5-8 inches; minimum, 1 inch. After eighty suspensions says he feels no better, but feels worse when he misses a suspension.

CASE III.—John F., aged 30. Ataxic. Fifty suspensions. No pains before treatment or afterwards. Gait very characteristic at first; after treatment walked more firmly; felt the floor better, though he did not appear to walk better. No change in station; will fall with both eyes closed. Still no K.-J. Still controls bladder and rectum. Pulse: Before suspension, 80; during suspension, 100; after suspension, 75. Respirations: Before suspension, 18; during suspension, 20; after suspension, 20. Average amount of extension, ¾ inch.

CASE IV.—Joseph McK., aged 50. Had occasional pains. After suspensions had scarcely ever pain. Gait remained characteristic. Still falls with eyes closed. Still no K.-J. Before treatment had no unusual desire to urinate and held his urine well; now he rises at night to pass water; he never before did so. Still holds feces and has more erections than he had before treatment. Pulse: Before suspension, 84; during suspension, 102; after suspension, 80. Respirations: Before suspension, 16; during suspension, 22; after suspension, 22. Average amount of extension, 1¼ inches; maximum, 1½ inches; minimum, 1¼ inches.

CASE V.—Raffael L., aged 44. Before treatment had much pain in limbs; after fifty suspensions much less. Walked only with assistance. Walk is improved; uses crutches. Falls if eyes are closed, though better in this respect. Still no K.-J., and has some incontinence of urine, though he holds feces and has occasional erections, as was usual. Pulse: Before suspension, 76; during suspension, 105; after suspension, 80. Respirations: Before suspension, 19; during suspension, 22; after suspension, 22. Average amount of extension, ¾ inch.

CASE VI.—James B., aged 44. Fifty suspensions. Having had much pain in limbs, they became less severe. Walk was characteristic; used no cane. Better in this. Sway with eyes closed great—now with eyes open. Antero-posterior sway, 2½ inches. Lateral, 1½ inches. K.-J. still absent. Incontinence of urine was very pronounced at times; this better; still retains feces. Sexual power good before; erections more frequent now. Pulse: Before suspension, 90; during suspension, 120; after suspension, 78. Respirations: Before suspension, 24; during suspension, 24; after suspension, 24. Average amount of extension, 9-16 inch; maximun, 1¼ inches, minimum, ½ inch.

CASE VII.—Joseph C., aged 48. Had dull, constant pains in the back and legs and girdle sensation. After fifty suspensions pains became worse if anything. Gait unchanged; characteristic; stumbled much. Station good; unchanged. Slight K.-J. Now gone. Good control of bladder and rectum. No change. Sexual power very much decreased; no change. Pulse: Before suspension, 74; during suspension, 116; after suspension, 70. Respirations: Before suspension, 16; during suspension, 30; after suspension, 20. Average amount of extension, 1 inch; maximum, 1¼ inches; minimum, ¾ inch.

CASE VIII.—John M., aged 50. After seventy-five suspensions had his severest attack of pain. Had shooting pains in the arms, shoulders and legs. After treatment became worse if anything. Gait was characteristic; used no cane. Unchanged. Station: swayed but very little. Had no K.-J. Had good control of bladder and rectum, but no sexual power. As to all these, no change. Pulse: Before suspension, 68; during suspension, 88; after suspension, 60. Respirations: Before suspension, 16; during suspension, 24; after suspension, 20. Average amount of extension, ½ inch; maximum, ¾ inch; minimum, ½ inch.

CASE IX.—Samuel H., aged 45. Had girdle sensation; darting pain in legs and numbness in the hands and feet. After eighty-four suspensions pain became less severe. But he has been taking more or less morphia. Gait was very characteristic and showed very little improvement at first; now he can walk six times as far. Sway was antero-posterior, 4 inches; laterally, 2½ to 3½ inches. After treatment, antero-posterior, 1 inch; laterally, 1 inch. K.-J. remained absent. "Urinates twice in twenty-four hours," and no change. Rectal power improved. Before treatment he rarely had erections; now has complete erections but not up to normal. General condition much improved. Pulse: Before suspension, 102; during suspension, 132; after suspension, 90. Respirations: Before suspension, 16; during suspension, 22; after suspension, 20. Average amount of extension, 1 inch; maximum, 1⅛ inches; minimum, 1 inch.

CASE X.—George S., aged 58. Fifty suspensions. Had darting pains in legs and body with numbness in toes and fingers. Pain became less severe. Fingers are numb and has pain in back. His characteristic gait remained unchanged. He fell at first with eyes closed; can now stand. K.-J. still absent. At first no control of bladder or rectum. This has improved. Sexual power "very bad" at first; this has improved. Pulse: Before suspension, 72; during suspension, 90; after suspension, 66. Respirations: Before suspension, 24; during suspension, 20; after suspension, 18. Average amount of extension, ½ inch; maximum, ¾ inch, minimum, ⅜ inch.

CASE XI.—Henry D., aged 58. Suspended seventy-five times. Sharp shooting pains down the legs became no less severe but less frequent. His characteristic gait improved. Sway at first antero-posterior, 5 inches; lateral, 4 inches; after treatment, antero-posterior, 4 inches; lateral, 3 inches. K.-J. slight, if any at first; none obtained afterward. Good control of urine and feces remained. Seldom has erection as before. His bladder was

benefited by boracic injections. Pulse: Before suspension, 84; during suspension, 102; after suspension, 84. Respirations; Before suspension, 20; during suspension, 28; after suspension, 16. Average amount of extension, ⅞ inch. General condition somewhat improved.

CASE XII.—Leo McC. Result of seventy-nine suspensions. Shooting pains remained the same. Unable to walk or stand at first; unchanged. No K.-J. before or after, and no sexual power. Still controls bladder and rectum. Pulse: Before suspension, 76; during suspension, 84; after suspension, 80. Respirations: Before suspension, 16; during suspension, 20; after suspension, 20. Average amount of extension, 1⅛ inches.

CASE XIII.—Mrs. John S., aged 50. After thirty-six suspensions her pains, which had been shooting, disappeared. Her gait had been characteristic but became better. She still fell when attempting to stand with eyes closed. Still had a slight K.-J. in both legs as before. Retains urine and feces as before. Has passed the menopause.

CASE XIV.—D. H. K. Suspended sixteen times. Had shooting and darting pains which were not frequent or severe. They were unchanged. His gait was characteristic and he could not stand with eyes open. These remained the same. K.-J. remained absent. He had a partial control of the bladder; this was unchanged. He still controlled his rectum and suffered from constipation. His sexual power and desire remained absent. Pulse: Before suspension, 120; during suspension, 140; after suspension, 108. Respirations: Before suspension, 18; during suspension, 24; after suspension, 18. Average amount of extension, 1 inch; maximum extension, 1⅛ inches; minimum extension, ¾ inch.

CASE XV.—Ella M. Suspended thirty-three times. Pains were infrequent. She had a characteristic gait, poor station and no K.-J. These remained the same. She still controls bladder and rectum as usual.

CASE XVI.—Joseph C., aged 40. Sensation before treatment; dull pains, feeling of being laced. After sixteen suspensions he had less pain. His gait was characteristic and with a cane and remained the same. He could not stand with eyes closed, but station improved, and could stand well but swayed a little. Knee-jerk remained absent. Occasional incontinence of urine present at first, but none after treatment. Power to hold feces, present at first, remained and occasional erections, present at first, continued to occur afterward. Pulse: Before suspension, 98; during suspension, 139. Respirations: Before suspension, 16; during suspension, 36. The patient failed to return after sixteen suspensions.

CASE XVII.—George H., aged 48. A pre-ataxic case. Extended only once, which, he said, made him feel better.

CASE XVIII.—J. M. F. Suspended twelve times. Some shooting pains, and marked analgesia remained the same as at the start. His gait was characteristic; his station poor, and he could not stand with eyes shut. These were unchanged. His K.-J. still absent. He still controls bladder and rectum, but his sexual power and desire are still absent. Pulse: Before suspension, 16; during suspension, 24; after suspension, 18. Average amount of extension, ⅝ inch.

CASE XIX.—Hector K. Suspended ten times. Frequent severe shooting pains remained the same as before. Still has the characteristic gait and is unable to walk alone or stand with the eyes closed. K.-J. still absent and still controls bladder and rectum. Respirations: Before suspension. 116; during suspension, 132; after suspension, 104. Respirations: Before suspension, 16; during suspension, 20; after suspension, 18. Average amount of extension, ⅜ inch.

CASE XX.—Charles M., aged 42. Suspended four times. Had very severe, often unbearable, pains; could scarcely walk with two canes; unable to st and alone. No K.-J. Had incontinence of urine. Has control of rectum. No sexual power for four years. Treatment very unsatisfactory; was suspended only four times; only once was able to remain three minutes. All symptoms increased.

CASE XXI.—William W., aged 41. Lateral sclerosis. Suspended seven times. His occasional pains became less severe. His gait was very characteristic and he fell with eyes closed. No better in these respects. K.-J. remained absent. He had no desire to urinate frequently and controlled his bladder well. He holds his feces and had occasional erections

which are becoming more frequent. Pulse: Before suspension, 90; during suspension, 120. Respirations: Before suspension, 20; during suspension, 26.

CASE XXII.—James McC., aged 48. Lateral sclerosis. Seventy-five to eighty suspensions. He had shooting pains throughout arms and legs, and fingers and toes were numb. These were less severe but unchanged in distribution. His gait remained spastic but was better and then jerked more. Station good and unchanged. K.-J. before, + +; after, + + +. He had partial control of bladder and good control of feces. He sees no change in this. His waning sexual power improved. Pulse: Before suspension, 80; during suspension, 108–120; after suspension, 80. Respirations: Before suspension, 20–24, during suspension, 24–36; after suspension, 24. Average amount of suspension, ¾ inches; maximum, 1 inch; minimum, ½ inch. He can do ordinary work; is not easily fatigued. General condition much better.

CASE XXIII.—Robert B., aged 53. Mixed sclerosis. Suspended forty times. Never had any pains. Gait "spastic with some flopping of feet." This was much improved. Station good; as it was before. K.-J. + + as before. He was able with difficulty to control his bladder and after treatment noticed improvement. He has better control of the rectum than before; his sexual power is weak and unchanged. Pulse: Before suspension, 72; during suspension, 84; after suspension, 66. Respirations: Before suspension, 16; during suspension, 24; after suspension, 18. Average amount of extension, 1⅜ inch; maximum, 1¾ inches; minimum, 1⅛ inches. He has improved so much that he can return to his trade as a carpenter. General condition good.

It seemed to me well to examine during suspension certain physiological variations of pulse, respiration, and also the anatomical change in length produced. These averages apply to pulse and respiration and were the resultants of observations made before, in mid-time of suspension, and five minutes after it. The lengths were single observations.

The pulse was often high beforehand, as is common in ataxia, and was not emotionally lifted, because no pulse studies were made until the patients were well used to the process. Whatever results were met with are certainly due, therefore, to suspension. The average pulse of fourteen ataxics, taken in the sitting position before suspension, was 89; the extremes were 120 and 68. The average during suspension was 113. The common rise was from 20 to 30 beats, but early in the treatment it was in rare cases 30 to 50 beats. The average pulse in the sitting position, five minutes after suspension, was 82, showing restoration to normal.

Respiration was (average) before, 17; during, 23; after, 20.

The changes in length of body were measured with extreme care near the close of the suspensions. The numbers here given represent averages for each man, being the gain in length from the vertex to the end of the coccyx.

The time of suspension varied from 10 minutes to 20 minutes, but the maximum of stretching was reached within 10 minutes and was as follows (average) in inches: 1¼, 1 3-16, ¾, 1¼, ¾, 9-16, 1, ½, 1, ½, ⅞, ¾, 1⅛, 1⅜, 1, ⅝, ⅜ inches.

Some curious extremes were met with, as, maximum in one case, 1¾ inches, and in another ⅜ inches, while the minimum in one case was 1½ inches and in another ½ inch. This variation on different days is interesting as showing the different degrees to which the tissues yielded to suspension. This seems to me an interesting point and worthy of further investigation.

Of the twelve cases which had fifty or more suspensions seven reported a lessening of pain ; two reported no change ; and one had had no pain to start with and none at the end, while two reported the pains worse.

Of the twelve cases five report increased sexual power ; four, no improvement ; one, lessening ; one was always good and one not stated. In no case was there such a gain in sexual power as to make a man competent who was incompetent before.

In five cases the gait was improved, while in seven cases it was unchanged.

Station improved in six, unimproved in four, and was good to start with in two.

Knee reflex unchanged in all the cases.

Bladder control was improved in four cases.

The rectal control was unaffected.

In conclusion, it is proper to say that many cases feel a certain indescribable sense of gain from suspension. They feel better, eat and sleep better and wish to continue the treatment.

As a therapeutic measure suspension is certainly worth a trial. I think that so far it has not done as well in ataxia as the treatment by prolonged rest and massage combined, which I advocated years ago and still employ. Perhaps systematic rest, massage and suspension might in their combined use do more than any of these alone, and this combination is on trial at the Infirmary for Nervous Diseases.